

Research on the Teaching Reform Path of Modern Engineering Management Based on BIM

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Keywords: BIM Technology, Engineering Management, Personnel Training, Curriculum System

Abstract: This paper studies how to integrate BIM Technology into the talent training and curriculum system of engineering management specialty. In view of the professional development of graduates, it determines the talent training objectives, adjusts the knowledge and ability requirements, formulates the curriculum system, and puts forward the direction of teaching reform, which provides reference for the reform and development of Engineering Management Specialty in relevant application-oriented undergraduate colleges.

1. Introduction

At present, the government is vigorously promoting BIM Technology. In 2016, the Ministry of housing and urban rural development (MOHURD) compiled the "2016-2020 development outline of construction industry informatization", which called BIM the key technology of informatization development [1]. Provinces have also issued guidance. In this context, the large-scale construction enterprises actively respond to the call of the government, and spontaneously apply BIM Technology in their own large-scale projects, in order to make the construction more efficient. At the same time, the overall level of information technology in China's construction industry is low and the information synergy is not strong, resulting in low profit margin of domestic construction industry output value and insufficient core competitiveness [2]. The current situation of this industry is largely due to the lack of excellent BIM talents. At present, many colleges and universities in China have begun to try to introduce BIM Technology into scientific research and teaching, but at this stage, there is no mature application of BIM Technology in the training program for undergraduates [3]; there is no specific program for which professional courses BIM curriculum should include in foreign countries [4]. For the current situation of BIM talent shortage, engineering management specialty should seize the opportunity to introduce BIM teaching into the classroom and improve the professional talent training mode and curriculum system.

2. Training of Engineering Management Talents Based on BIM

2.1. Career Orientation and Jobs

Professional orientation: construction engineering consulting management enterprises, construction enterprises, construction industry management departments and relevant enterprises and institutions. Initial positions: BIM modeling engineer, BIM project management engineer, Engineering Data Engineer, assistant cost engineer. Development position: Construction Engineer, cost engineer and relevant technical management positions related to project management.

2.2. Training Objectives

BIM based engineering management majors are mainly consulting, management companies, construction companies, industry management departments, other relevant enterprises and institutions. In order to build the basic theory and professional knowledge, engineering management needs cultivation. And has BIM Technology and engineering management. Ability and professional

skills to adapt to the development of modern construction industry and high-quality composite talents.

2.3. Knowledge Requirements and Ability Requirements

Master the professional knowledge of material application and testing, construction investigation, construction organization, project management, quality inspection, etc. Master the principles and methods of construction engineering and the steps and methods of construction and decoration. Reconcile with the project budget; master the project volume theory and list evaluation method; master the computer engineering cost; master the technical bidding and bidding procedures, master the basic methods of project cost management, and understand the basic knowledge of construction economy; relevant general construction and economic laws and regulations[5]; please understand the assets, liabilities, owner's equity, income, profit, loss of construction enterprises, accounting technology calculation Methods, products, activity cost methods and accounting methods for preparation of financial statements; basic knowledge of construction enterprises and basic methods of financial management. Skill requirements: all types of word processing, table design and data processing can be completed by computer; engineering construction and production activities can be combined with project cost, evaluation and management, can be engaged in project management, complete project proposal and solve the basic principles of project participation in economic construction and the general problems in project cost management[6]; act in accordance with the law in project cost management The ability to make project budget; the ingenious use of budget allocation; the ingenious use of consumption allocation to formulate the reference of project quantity list; the use of computer to make project quantity budget and reference; the ability to skillfully complete all the work of project bidding reference; the ability to handle various works of project claims; the ability to prepare project solutions; the use of financial accounting knowledge and projects for project cost analysis The solution of economic problems in cost

3. Course system of Engineering Management Based on BIM

3.1. Basic Route

Public venues include: cultivation and legal basis of ideology and morality, outline of modern Chinese history, basic principles of Marxism, Mao Zedong Thought and China's characteristics and socialist theoretical system, college foreign language, high mathematics, linear algebra, introduction. Probability theory and mathematical statistics, literary text interpretation, college physical education, college computer consortium, Fundamentals of programming, military theory courses, psychological quality training for college students, safety education, status and policy, career planning, etc.

3.2. Professional Education Curriculum Professional Education Curriculum Mainly Includes Three Parts

Professional basic courses, professional core courses and professional courses. The basic line of the occupation, mainly including the drawings of construction materials, engineering mechanics, management, engineering economics, engineering structure, civil engineering, civil engineering, residential construction, engineering investigation, operational research and other professions, including the main line as the construction engineering cost, construction rules, construction project cost, project bidding, contract management, construction project management, construction project distribution, budget Calculate and wait[7]. Construction supervision, real estate development and operation, project evaluation, engineering network planning technology, Revit modeling, introduction of Bim and application (rebar calculation) (civil engineering calculation). Through the combination of new curriculum and implantation, BIM curriculum is newly added and combined with the implementation curriculum system, and students' BIM Technology is gradually improved. Inject BIM field distribution module, such as civil engineering, engineering bidding and contract management, prepare bidding documents, transplant BIM model to simulate bidding process.

3.3. Practical Curriculum System

Practice curriculum system is divided into four parts[8]: basic practice level, engineering cognition level, comprehensive practice level and innovative practice level. Basic practice level includes basic computer skills training, VB language course design and military training; engineering cognition level includes drawing training of civil engineering specialty, computer-aided drawing, cognition practice, engineering measurement training and building materials training. The comprehensive practice level includes the course design of civil engineering construction, the course design of construction engineering quota and budget, the course design of engineering cost, the course design of installation engineering cost, graduation practice and graduation design. The innovation practice level mainly includes the academic paper writing and so on. Practice teaching is an important part of training application-oriented talents, so building BIM based practice curriculum is more practical, mainly reflected in the comprehensive practice level.

4. Teaching Reform Direction of Engineering Management Based on BIM

4.1. Construction of BIM Training Center

BIM training center is an in-school training place that integrates the internal teaching of BIM Technology, the training of teachers and employees of foreign universities, and provides external technical services. It is also an important base for training talents in short supply of BIM Technology. The budget investment is about 2 million yuan[9]. It is recommended to give priority to one-time investment in construction. If the funds are not in place, the construction can be carried out in stages.

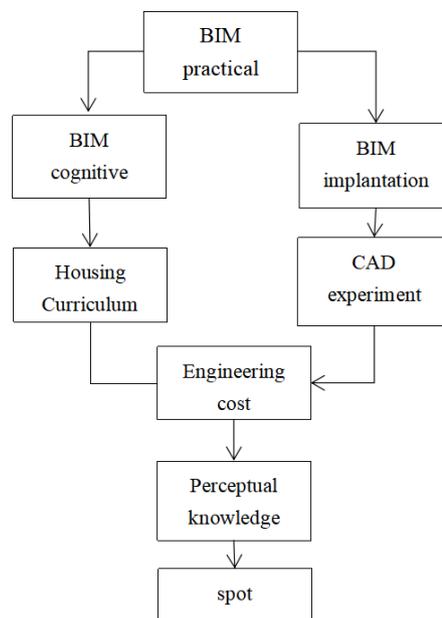


Figure 1 BIM based practical teaching reform system

4.2. Deepen School Enterprise Cooperation

School enterprise cooperation is the only way for the development of Engineering Management Specialty Based on BIM, and it is also an important way to realize the combination of production, learning and research, and to cultivate high-quality applied talents. There are several ways to deepen the cooperation between schools and enterprises of Engineering Management Specialty Based on BIM: ① jointly formulate the training plan and training mode reform plan of professional talents, so as to make the training objectives and curriculum more suitable for the needs of enterprises. Secondly, enterprises participate in the construction of courses and training bases,

teaching diagnosis and other work, which makes the evaluation results more realistic. ③ the enterprise participates in the formulation of student internship training plan and program, internship management system, and reasonably guides students to participate in the BIM project of the enterprise. ④ actively organize professional course teachers to practice in enterprises to enhance the practical ability of teachers; vigorously carry out the training of enterprise employees in schools, expand the communication channels between schools and enterprises, and realize mutual benefit and win-win between schools and enterprises. ⑤ the University and the enterprise jointly establish a BIM production university research cooperation platform, carry out technological innovation, product research and development, and subject research, and jointly strengthen the technical capabilities of both the University and the enterprise.

5. Specific Measures of Teaching Reform of Engineering Management Based on BIM Technology

5.1. Clear Teaching Objectives

To integrate BIM Technology into the development of Engineering Management Education in Colleges and Universities First of all, it is necessary to make clear the teaching objectives and directions. Usually, teachers will teach according to the syllabus, but they also need to keep pace with the times, integrate the technological innovation results into the syllabus, and make some minor adjustments in time, which is also the basis for launching the follow-up professional teaching courses according to the established teaching objectives. Therefore, in terms of curriculum, teachers should have a clear teaching direction and carry out the reform of Engineering Management Teaching on the basis of BIM Technology. It is precisely because this technology will probably have a great influence in the civil engineering industry in the next few years and decades, so teachers can discuss with each other, finally agree on the teaching objectives and clarify the actual teaching development Body link.

5.2. Course Optimization and Innovation Based on BIM Technology

Although at present, with the continuous promotion and popularization of BIM Technology, many colleges and universities have introduced BIM Technology and integrated it into the development of professional courses. However, due to different understanding of BIM Technology, different colleges and universities have different degrees of introduction. Some schools simply introduce theoretical content and offer a few periodic courses, which is very unfavorable to optimize and innovate courses based on BIM Technology. The first step of innovation is to be familiar with BIM Technology and have a clear understanding before adjustment and optimization can be carried out according to the actual situation of relevant technologies and courses. This is similar to the fact that BIM is needed to carry out positive design in the architectural design stage.

6. Conclusion

With the vigorous development of BIM Technology, the construction project management mode will have a revolutionary change. It is of great significance for the reform and development of engineering management major in Application-oriented Universities to study how to integrate BIM Technology into the talent training and curriculum system of engineering management major, determine the talent training objectives, adjust the knowledge and ability requirements, formulate the curriculum system, and put forward the direction of teaching reform according to the career development of graduates. At the same time, more in-depth research should be carried out in BIM curriculum standards, curriculum resource construction and other aspects in order to cultivate engineering management graduates who meet the requirements of the modernization of the construction industry.

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